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AUTHOR Camp, Bonnie W.; Bash, Mary A.
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ABSTRACT

This program adapts the Think Aloud method, originally designed to assist young aggressive boys in achieving greater self-control, to improve problem-solving skills among first and second graders. Modeling of self-instructional verbalizations is used to teach children a systematic approach to analyzing a problem, planning an attack and evaluating outcomes. The classroom version concentrates on cognitive and academic problem situations. Fourteen randomly-assigned first- and second-grade classrooms received the Think Aloud program in one of three waves. All were pretested on the Raven Progressive Matrices, and children from each class were randomly assigned for retesting at the end of each wave. Fourteen regular classroom teachers learned to use the "Think Aloud" techniques for their entire classrooms. The process of modeling self-verbalizations was explained, demonstrated, and role-played in a preliminary session without pupils present. Teachers then observed a staff assistant introduce the program to the class. For one month, the regular teacher and staff assistant observed or taught Think Aloud to the class on alternate days. After teachers became comfortable with the program, they were encouraged to transfer the techniques from project materials to regular academic material. The presentation includes the program description and a brief video-tape of the program in action, a discussion of teaching it to regular classroom teachers, and results of cognitive test performance.
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The Classroom "Think Aloud" Program

Bonnie W. Camp and Mary A. Bash

University of Colorado Medical School

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The classroom "Think Aloud" program

Think Aloud (Camp, et.al. 1977) is a cognitive behavior modification program originally designed for assisting young aggressive boys to improve self-control through use of verbal mediation strategies. It was originally developed for use with one or two children at a time. The program was based heavily on the work of Meichenbaum and Goodman (1971) and the work of Shure and Spivack (1974). As with these parent programs, Think Aloud placed heavy emphasis on helping children to verbalize a problem, develop plans and evaluate their results. As we saw it, there were three key elements in this 1) children learned to "think out loud", i.e. to use overt self-instruction, to keep their thinking focussed on the task and their performance directed toward their stated goal, 2) modeling was employed extensively and 3) both social and non-social problems were addressed. For example, (here elaborate a simple example of the technique and style).

Initial results with this program were very encouraging with respect to improving cognitive performance in young aggressive boys and pro-social behavior in the classroom. In our initial trials, we demonstrated "normalization" in the cognitive pattern of treated aggressive boys as compared to untreated aggressive boys and untreated normal boys.

Insert Figure I

Treated boys also showed significantly more improvement in pro-social behavior in the classroom than untreated aggressive boys.

Subsequent trials using resource teachers to deliver the program showed similar though not as powerful results. In the process of working with an individual program however, we became convinced that maximum effectiveness could not be achieved in the educational setting without involvement of regular classroom

teachers. We also found that teachers did not just naturally understand how to use Think Aloud techniques in the classroom. Thus it was clear that a training program would have to be developed for classroom use if we were to obtain regular classroom teacher assistance in promoting generalization of behaviors learned in the individual program.

As we thought about it, we also realized that a program teaching problem solving skills could benefit a variety of children, not just those with aggressive behavior problems. We had originally selected the aggressive group for study because of interest in understanding the role of cognitive deficit in this group of children. Conceivably, non-aggressive children with deficiencies in problem solving skills might also profit from our training program. In fact educators have commented on the apparent lack of such skills as a major element in many learning disorders.

The impact of a classroom program might be expected to be more diluted than that of an individual program. However, it would also reach a broader range of children including the sizeable group of mildly ineffective children who could profit from milder boost provided by a classroom program.

Designing a Classroom Program

Two major problems confronted us from the outset. One concerned the development of materials and procedures which could be used in a group setting to elicit self-guiding speech. The second problem concerned how to teach teachers to model verbalization of their own cognitive behavior and to let children develop their own solutions.

The first problem required development of both technique and materials. The core of the Think Aloud program is use of self-guiding speech in problem-solving. Overt practice is required before this verbalization is faded to a covert level. How does one get young children to verbalize aloud in this fashion. In the individual program, we used the "copy cat" game to elicit attention for both speech and gestures. A similar procedure could be used with groups. This results in unison repetition of standard answers and was employed frequently in educational settings. It has many obvious problems including the fact that children often repeat mindlessly without thinking about what they are saying. Many educators would look with horror on the situation where 30 children in a classroom are all talking at once and saying different things. We had, however, seen effective use of individual verbalization in small groups at the Exemplary Center for Reading Instruction in Salt Lake City and thought it worth trying.

There was still the problem of finding appropriate materials so that every child in the classroom could be participating. The final program drew on a wide variety of materials and procedures to elicit verbalization of plans, alternatives, coping with errors, conceptual shifts and memory.

And finally we decided to try a teacher training program which lasted one month. This involved one or two preparatory sessions in which modeling was practiced specifically followed by daily lessons in the classroom during which the staff member alternated days as teacher and observer.

Preliminary Trials

This preliminary program was tried out in 15 first and second grade classrooms in two Denver Public Schools. The majority (13) were in one large, integrated primary school which was primarily designed for open classes. Local authorities judged the probable educational value of the program to be such that the program could be included as part of the regular curriculum being offered to all children. Individual testing to be performed for purposes of program evaluation did, however, require parent permission.

Teachers from the fifteen classrooms were assigned to work with the program in three waves of 5 teachers. Because of scheduling problems, it was not possible to do this entirely at random. In addition, children had not been randomly assigned to the individual classrooms. Both of these problems influenced our ability to evaluate program effects. However, we pre-tested all children then randomly assigned one-third of the children in each classroom to be re-tested at the end of one month, two months and three months.

At each of these times except the last, some children would have been in the program and some would not. Several problems arose after the first wave of teachers were trained so that only comparison of the first wave of trained and untrained children will be presented.

After much search we chose the Raven Progressive Matrices as our major tool for evaluating program effectiveness. Contrary to Jensen's claims, there was some evidence that scores on this test could be altered by training and we were unable to find anything else which was appropriate for our purposes. After testing 238 First and second graders with this test, we found that previous norms were unsuitable. We found that six to seven year olds in this population were averaging scores previously reported for seven to eight year olds. For retest comparison we selected only those children whose initial Raven scores were below average for the entire population, i.e., those with scores below 19.

Results

Table I presents pre and post test results on the Raven for children with scores equal or below 18 who received training in the first month compared to results obtained from a random selection of children in other classrooms who were waiting for participation. These results are very simple, namely, those children who

participated in the Think Aloud training program showed significantly ($p < .03$) more gain in scores on the Raven than children who had not received the training. We also collected anecdotal evidence from teachers of how they had found application Think Aloud principles in teaching the regular classroom work. As might be expected, those who seemed most enthusiastic and learned the program readily were the ones who were utilizing it in other areas of teaching after the training stopped. We were also gratified to hear of individual children who were observed to apply Think Aloud techniques spontaneously in other contexts.

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Table I

Comparison of improvement in Raven Scores among low scoring children in Think Aloud and control groups.

Group	n	Difference Score		<u>t</u> /
		X	SD	
Experimental	9	5.0	2.9	2.20
Control	24	2.5	3.1	($p < .025$)

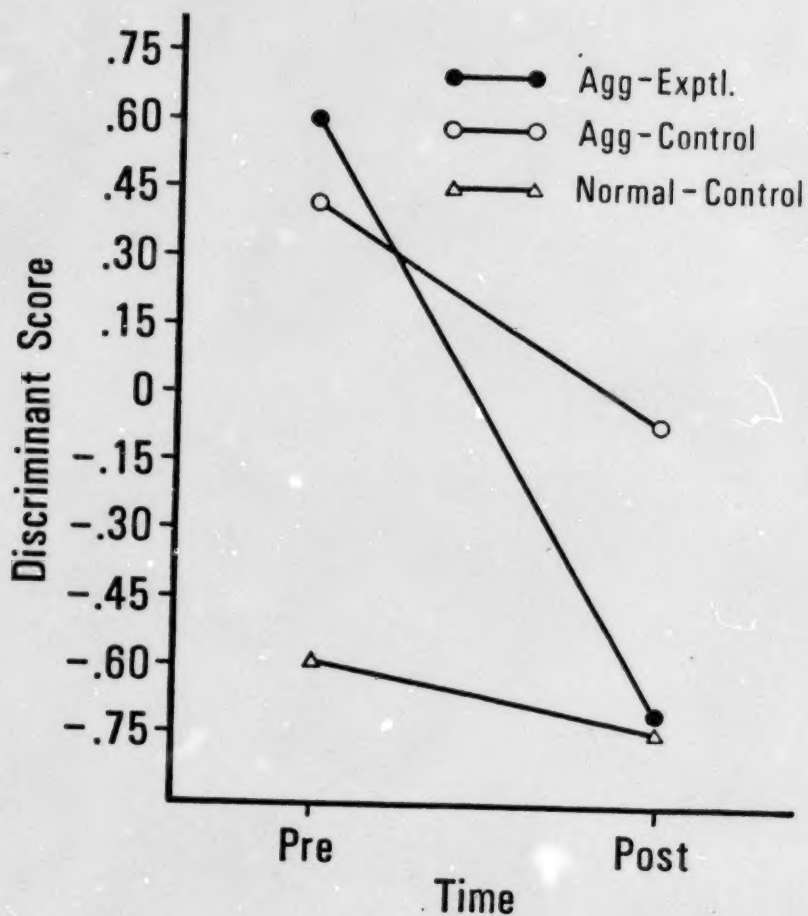


Figure 1. Pre and Post Discriminant Scores for Aggressive-Experimental, Aggressive-Control and Normal-Control Groups.